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THE NEW STAR IDENTIFICATION TABLES OF THE HYDROGRAPHIC OFFICE

BY

G. W. LITTLEHALES

The United States Hydrographic Office has just brought out, as a result of extensive and laborious computations, a convenient and important work in recognition of the value of observations of the stars and planets for the purpose of ascertaining the compass error and the geographical position of ships at sea and of the necessity of employing such observations in consequence of the increased speed of vessels employed in ocean transit. With every attempt to make ships go faster and get farther in a given time, greater frequency in determinations of geographical position become more important, because the reckoning of ships is rendered more and more uncertain, by the diverting forces of the elements, in proportion to the distance traversed from the latest ascertained position.

The navigator, able only to find his ship's position and the error of the compass by observations of the sun, has, therefore, but a limited and consequently, imperfect command of the art of navigation. In these days of keen competition, when the difference of a few tons of coal, or a few hours in the length of passage, may mean all the difference between profit and loss, or between safety and disaster, he must recognize the great advantage and extreme importance of employing also in his service the stars that "rule by night."

Sir John Herschel said: "Every well determined star, from the moment its place is registered, becomes to the astronomer, the geographer, the navigator, the surveyor, a point of departure which can never deceive or fail him, the same forever and in all places, of a delicacy so extreme as to be a test for every instrument yet invented by man, yet equally adapted for the most ordinary purposes; as available for regulating a town clock as for conducting a navy to the Indies; as effective for mapping down the intricacies of a petty barony as for adjusting the boundaries of Trans-Atlantic empires."

From remote antiquity, the heavens were mapped out into constellations and groups of stars in which, by the aid of a fertile imagination, some resemblance was traced to the various beasts, birds, fishes, and classical heroes whose names were assigned to them.

The most ancient records allude to the constellations by these distinctive names. In the Old Testament, in the book of Job, we read of the "bands of Orion" and "the sweet influence of the Pleiades"; and in the writings of Hesiod and Homer are names as familiar to the astronomer of to-day as they were to the observer in the ages when science was in its dawn. Besides the designation by name of the most conspicuous stars and of the groups or constellations, the stars in each constellation are distinguished for reference by letters and numbers; and in connection with the name or other distinguishing designation of each of them, astronomers have registered its place in the firmament by measured co-ordinates which are called declination and right ascension and which are somewhat comparable with latitude and longitude on the surface of the earth.

In finding any star in the heavens from a map of the constellations, it is necessary to refer to some one star or constellation as known, such as the Great Bear, also called by the Latin name Ursa Major, and then to recognize others in accordance with the configuration of the map; for, by supposing a line to pass through two such known stars, it may also pass through or near another star whose name is required; or by producing a line to a certain distance estimated by the eye, the same end is obtained.

Probably the reason why stellar observations have been so little practiced at sea is to be found in the extreme inconvenience, if not impossibility, of identifying the observed stars by means of star maps or by recognizing the configuration of the heavens. In stormy weather with partly clouded skies obscuring the arrangement of the constellations, the navigator was frequently prevented from recognizing any of the few stars showing at a time and hence from obtaining results at the very times when they might be most indispensable to his safety. How many sights have been found useless because the observer thought he was observing one star when in reality pointing his telescope at another? How many coveted results have escaped the navigator, because, on account of clouds obscuring its neighbors, he could not feel sure of the identity of the one star that was visible?

What the Hydrographic Office has done to relieve ocean commerce of the impediments thus arising is to pave the way for the unrestricted application of the science of astronomy to navigation by providing in simple tabular form the means for converting the altitude and approximate bearing of any star, which the navigator may measure with his sextant and compass, into the corresponding declination and right ascension, the co-ordinates by which they are catalogued in the lists giving the names and magnitudes of stars. The navigator is thus rendered independent of any previous knowledge of the constellations and the names of the stars he may observe, and, instead of being confined to the employment in his observations of those stars which he may be able to recognize, is enabled to identify any star that is bright enough to observe.

MAXIMUM, MINIMUM AND AVERAGE HYDROGRAPHS OF THE MISSISSIPPI RIVER*

BY

ROBERT M. BROWN
State Normal School, Worcester, Mass.

The diagrams presented with this paper represent composite hydrographs of the Mississippi river at five stations and were compiled from the comprehensive hydrographs of the river from the time when the records were first tabulated to the present as printed in the Report of the Mississippi River Commission for the year ending June 30, 1909. In each illustration, the upper curve represents the absolute maximum stage of the river for the location; the lower curve, the absolute minimum; and the continuous line the average hydrograph. Figure 1 portrays the stages at Hannibal, Mo., on the Mississippi river; Figure 2, stages at Hermann, Mo., on the Missouri river; Figure 3, at St. Louis just below the confluence of the Upper Mississippi and the Missouri river; Figure 4, at Cairo, Illinois, on the Ohio river; and Figure 5, at Memphis, Tennessee, where the combined effect of the upper rivers is recorded.

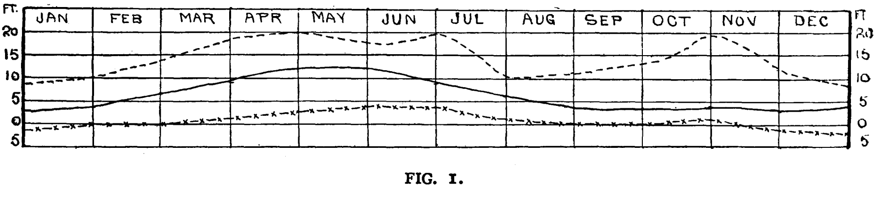

FIG. 1.

Figure 1. Hannibal. 329.4 miles above Cairo. Zero of gage is 469.60 feet above the Cairo Datum plane. These curves are taken

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* Paper read before the Association of American Geographers at Boston, January, 1910.